National Grid NG SINGAPORE

Incompressible Turbulent Flow

Project Introduction

Objectives
To investigate incompressible jet flows.

Project Investigator / Manager
Dr. Tsai Her Mann
Temasek Laboratories
tslthm@nus.edu.sg

Period of Project
04 Jul 2003 – 31 Jul 2006

Website
www.temasek-lab.nus.edu.sg

Abstract
To improve combustion and jet exhaust through the investigation of incompressible jet flows.

Project Details

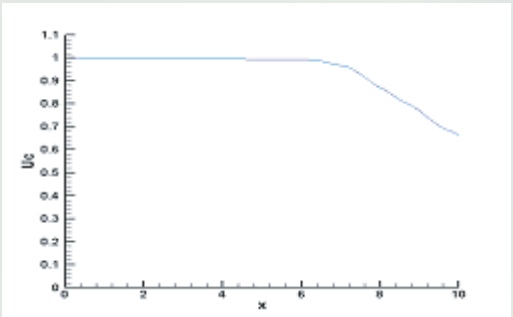
Description
Through a better understanding of the physics in jet flows, passive jet control methods may be devised so as to achieve improved mixing. Improved mixing properties, in turn, have applications in several areas such as combustion and jet exhaust.

The application is capable of incompressible, low Reynolds number flow simulations. It is scalable to the effect that a larger number of nodes allows a shorter computation time.

The application has a specialized use in simulating incompressible jet flows. Apart from being limited to incompressible low Reynolds, it is otherwise generic in use in flow simulations.

A benchmark simulation of an incompressible circular free jet is carried out at a Reynolds number of 1500.

The following figure shows the computed streamwise variation of the mean centerline axial velocity, Uc. The velocity decay constant is evaluated to be 5.4, consistent with past experimental and computational results.



Streamwise variation of Uc.